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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/709,704 | 05/24/2004 | Alex Colvin | 81100109 | 3703 |

46535 7590 09/19/2005

BIR LAW, PLC/FGTL
45094 MIDDLEBURY COURT
CANTON, MI 48188-3215

| EXAMINER | |
|---|---|
| MCCALL, ERIC SCOTT | |
| **ART UNIT** | **PAPER NUMBER** |
| 2855 | |

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/709,704 | COLVIN ET AL. | |
| | Examiner | Art Unit | |
| | Eric S. McCall | 2855 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,12-27,29-32 and 35* is/are rejected.

7)☒ Claim(s) *5,6,9-11,28,33 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *May 24, 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

# ***PORTABLE VEHICLE EXHAUST FLOW SENSOR***

## ***FIRST OFFICE ACTION***

### ***SPECIFICATION***

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. The Applicant's cooperation is requested in correcting any errors of which the Applicant may become aware of in the specification.

### ***CLAIMS***

*35 U.S.C. § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 12-21, 23-27, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Weigand (5,837,903).

With respect to claim 1, Weigand teaches a method for real-time determination of exhaust gas flow through an exhaust pipe of a vehicle (Fig. 1), the method comprising:

measuring a pressure difference upstream (22) and down-stream (24) of a screen (18);

measuring exhaust gas temperature (23; col. 2, lines 57-59); and

determining the exhaust gas flow based on the pressure difference and the temperature (col. 2, lines 59-63).

With respect to claim 12, Weigand discloses the screen (18) covering "substantially" the entire area of the exhaust pipe as claimed (Fig. 1).

With respect to claim 13, the screen mesh of Weigand is interpreted as generating a measurable pressure difference while minimizing back pressure and the formation of condensation on the screen.

With respect to claim 14, the screen of Weigand is deemed as including "about" six strands per inch arranged in a generally rectangular array that extends across the exhaust pipe as claimed.

With respect to claim 15, Weigand teaches a portable system for determining exhaust gas flow of a vehicle, the system comprising:

a tube (12) adapted for placement on an exhaust pipe of the vehicle, the tube including a flow restricting element (18) extending across a cross-sectional area of the tube, a first port (22) disposed upstream of the flow restricting element for measuring a first pressure, and a second port (24) disposed downstream of the flow restricting element for measuring a second pressure; and

a device in communication with the tube for determining the exhaust gas flow based on a difference between the first and second pressures (col. 2, lines 59-63).

With respect to claims 20, 21, 23, 24, and 27, Weigand suggests the claimed subject matter thereof.

With respect to claim 32, Weigand teaches a portable exhaust gas flow sensor for real-time on-board measurement of exhaust gas flow from a vehicle, the sensor comprising:

a straight tube (12) for connecting to an exhaust pipe of the vehicle, the tube including an interior screen (18) to generate a pressure drop as exhaust gas flows across the screen, an upstream port (22) for measuring pressure upstream of the screen, a downstream port (24) for measuring pressure downstream of the screen, and a thermocouple port (23) for measuring exhaust gas temperature;

a differential pressure transducer in communication with the upstream and downstream ports for generating a signal based on a pressure difference between the upstream and downstream ports (col. 10, lines 65+);

a thermocouple in communication with the thermocouple port for generating a signal based on temperature of exhaust gas flowing through the straight tube (col. 4, lines 26-29); and

a processor for receiving the signals from the differential pressure transducer and the thermocouple and determining exhaust gas flow based on the received signals (col. 2, lines 59-63).

*35 U.S.C. § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 7, 8, 22, 29-31, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weigand (5,837,903).

With respect to claims 2 and 3, Weigand teaches the determination of exhaust gas flow but fails to teach the determination being based on a square root of the quotient of the pressure difference and the temperature.

However, it would have been obvious to one having ordinary skill in the art to determine the exhaust gas flow based on a square root of the quotient of the pressure difference and the temperature.

The motivation being that the determination being based on a square root of the quotient as claimed is merely a mathematical manipulation of the determined pressure and temperature. The only difference between the claimed invention and the prior art being the obtaining of the square root of the quotient, and obtaining a square root of a quotient is a commonly performed mathematical function and thus is not deemed to be patentably distinct over the prior art.

Claim 4 is not deemed patentable over the prior art because, likewise to claim 2, claim 4 merely sets forth a mathematical manipulation of the determined exhaust flow.

With respect to claim 8, the claim merely sets forth a known relationship between differential pressure and flow.

With respect to claim 22, Weigand is silent as to the make-up of the entire screen (18). However, the use of stainless steel to make the screen, as claimed, would have been obvious to one having ordinary skill in the art.

The motivation being that stainless steel is a very common and popular material used in the making of exhaust systems and components due to the ability to withstand the corrosive nature of exhaust gas.

With respect to claims 29 and 30, Weigand recognizes the need to eliminate condensation but fails to teach a condensation trap as claimed.

However, it would have been obvious to one having ordinary skill in the art to use a condensation trap as claimed in combination with the system as taught by Weigand.

The motivation being that Weigand discloses that the presence of condensation will plug the flowmeters and sampling lines.

Claim 35 is not deemed patentable over the prior art because the claim merely sets forth a mathematical manipulation to determine the exhaust flow.

*Allowable Subject Matter*

Claims 5, 6, 9-11, 28, 33, and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claims 5 and 6, the prior fails to teach or suggest the measuring of the pressure difference as respectively claimed.

With respect to claim 9, the prior art fails to teach or suggest the calibrations at the flow conditions as claimed.

With respect to claims 10 and 11, the prior art fails to teach or suggest the pressure difference adjusting as claimed.

With respect to claims 28, 33, and 34, the prior art fails to teach or suggest the use of a plurality of pressure transducers based on different exhaust flows as claimed.

## ***CITED DOCUMENTS***

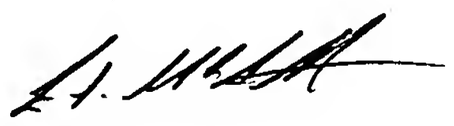
The Applicant's attention is directed to the enclosed "PTO-892" form for the documents made of record at the time of this office action.

## ***CONTACT INFORMATION***

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric S. McCall whose telephone number is (571) 272-2183.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Eric S. McCall
Primary Examiner
Art Unit 2855
Sep. 15, 2005